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ABSTRACT

A study was conducted at the 14 community colleges (17 campuses) in Pennsylvania to assess the perceptions of faculty about the relative importance of course content items in a beginning credit course in computer literacy, and to survey courses currently being offered. A detailed questionnaire consisting of 96 questions based on MECC (Minnesota Educational Computing Consortium) objectives was mailed to 178 faculty, of whom 124 responded (70% rate of return). Analysis of the 118 usable responses indicated that: (1) faculty in business, computer science, and mathematics accounted for more than half of the returns; (2) respondents considered 50 areas to be important enough to include in a three-credit course; (3) two of the campuses require a computer literacy course of all their students; (4) major programs requiring computer literacy are business, accounting, computer science, and secretarial science; and (5) 2 campuses offer both credit and non-credit computer literacy courses and 11 offer credit courses. It is recommended that a computer literacy course emphasize (1) five areas considered important by more than half of the respondents, i.e., applications, limitations, software, values, and usage; and (2) 50 items that received the highest ranking, including 16 in application, 9 in software, 7 in hardware, 6 in limitations, 5 in values, 4 in impact, and 3 in usage. A copy of the questionnaire and 24 references are included. (DJR)

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COMPUTER LITERACY IN PENNSYLVANIA COMMUNITY COLLEGES

COMPETENCIES IN A BEGINNING LEVEL COLLEGE COMPUTER LITERACY COURSE

by

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NATURE AND BACKGROUND OF THE STUDY

Computer literacy is not defined in the dictionaries, yet it is generally defined by various authors as understanding, and being able to use a computer (Masat, 1981). Nationally, the discussion continues over what it means to be computer literate. According to various authors (Johnson et al. 1980; Klassen et al. 1980), computer literacy includes all or portions of the following:

- -Imparting knowledge about handling information
- -Dispelling fears and myths associated with computers
- -Developing skills in using and programming a computer
- -Developing procedural learning
- -Addressing the ethical and social issues raised by computing (Masat, 1981, p.4).

According to Masat (1981), many attempts have been made to develop computer literacy courses from kindergarten through college, but few attempts have been made to determine general course content, especially at the college level. Masat states that the organization of the curriculum at the college level, for the most part, has been haphazard; a particular department (usually the data processing department) has developed a course to meet the needs of data processing majors. This

course is then offered to all students who wish to become computer literate without regard to the students' background, or future educational needs. In the event that this data processing course does not meet the needs of non-data processing majors, bits, pieces, and whole courses are designed to fill in the gaps. Masat further contends that in no case has a concerted effort been made to design a course whose contents would meet the needs of every student regardless of that student's major. He explains that if colleges are to meet the needs of students and develop a basic computer literacy course, a consensus must be reached on course content. Furthermore, Tobin (1983) states that a major educational goal has always been the development of students who are literate, and in the 80's literacy goes beyond reading, writing and arithmetic to include computers. However, the variations in approach and content among the computer literacy materials is considerable.

If one peruses the literature in this area (Johnson, et al, 1980), it soon becomes apparent that different authors place priorities on different aspects of computer literacy content. On one extreme is the emphasis on knowledge and concepts related to hardware and programming. At the other extreme is the emphasis on awareness of application and computer issues.

Indeed, Stuart Denenberg has called computer literacy:

> a term that currently allows a spectrum of definitions, at one end is the ability to distinguish a computer from a horse - at the other end is a broad and deep knowledge of computer history, hardware, software, social issues and applications as well as facility in one or more programming languages. (Welman & Heller, Feb., 1983, p.3).

The problem is further complicated by differences of opinions as to what faculty in various disciplines consider important course content for a student to be computer literate. The greatest controversy appears to be between computer science faculty and liberal arts faculty since their students have entirely different educational goals. Added to this confusion, is the administrator who frequently sees a computer literacy course only in the light of budget costs, equipment needs, staffing problems and other management concerns.

It would appear that community colleges are especially at a disadvantage in developing a computer literacy course because of the great diversity of ability and educational goals within their student body. These colleges must cope with extremes such as: 1) the high school student, or computer "nut" who has been involved with computers since he or she could first place tiny fingers upon a keyboard; 2) the older student who is returning to college and has not only

never used a computer , but is also frightened of these "newfangled contraptions". Exceptions, such as advanced placement, credit by exam and other similar measures will have to be made for the entering student who already possesses computer literacy skills. But without a well defined course content , how can exceptions be determined?

The primary purpose of this study was to assess the perceptions of faculty about the relative importance of course content items in a beginning credit level, computer literacy course. The secondary purpose was to survey computer literacy courses now being offered.

STATEMENT OF THE PROBLEM

This study investigated the perceptions of faculty by ranking course content for an entry level community college computer literacy course. Data will be presented to answer the following questions:

RESEARCH QUESTIONS

1. Are there any MECC content areas ranked as being of greater importance than others in determining course content?

2. Are there any MECC objectives ranked as being of greater importance than others for a community college entry level computer literacy course ?

3. Are computer literacy courses currently being offered at the campuses of the community colleges in Pennsylvania?

4. Are computer literacy courses that are offered being given for credit or non-credit?

5. Are credit computer literacy courses offered for one, two or three credits?

6. Are credit computer literacy courses required in any major?

Summary

The purpose of this study was to investigate the perceptions of faculty about course content for a three credit computer literacy course. Furthermore, the study ranked the questions from highest rating to lowest, and also compared the categories to determine if they were related.

The study was conducted at the fourteen community colleges in Pennsylvania (17 campuses). A detailed questionnaire consisting of ninety-six questions based on the Minnesota Educational Computing Consortium (MECC) objectives was mailed to 178 faculty identified by their department heads/chairs as having an interest in computer literacy.

The range of interest includes a low of one department to a high of eight departments from one institution, with a total of twenty-two departments with one hundred twenty-four of the one hundred

seventy-eight recommended people responding to a questionnaire in the fourteen community colleges expressing an interest. The average number of department heads contacted was 3.5 from each of the seventeen campuses.

Conclusions

The first conclusion reveals that faculty in three departments made up 60% of the responses. These three departments, business (40 faculty), computer science (43 faculty), and mathematics (25 faculty), had a total of twenty or more faculty members recommended for the survey. Three other departments, behavioral science, communications, and engineering had a total of nine recommended faculty. The departments of Fine Arts, Humanities, and Life Sciences had a range between 5 and 7 people recommended. The departments of Chemistry/Physics, Electronics, Learning Resources, Nursing/Allied Health, Psychology, Social Science and Votech Education range between 2 and 4 recommended faculty. Only departments of Secretarial Science, Political Science, Natural Sciences, Drafting, Biology and Accounting had only one name recommended.

A second conclusion reveals that a 70% (124) return on the questionnaire indicates an interest in computer literacy. Of the 124 returns, 118 were

tabulated in the survey. Six questionnaires were returned unusable for the purpose of this study. The faculty returning these six questionnaires expressed an interest in the study but a lack of knowledge that prevented adequate responses to some parts of the questionnaire.

The third conclusion indicates that there are fifty areas that the respondents consider to be of enough importance to include in a three credit computer literacy course. These fifty questions include 100% from Limitations, 76% from Applications, 69% from Software, 60% from Usage, 56% from Values, 35% from Hardware, and 25% from Impact. No questions were considered important enough from the category of Programming to be included in the top fifty.

The fourth conclusion indicates that four of the categories appear to be more important than the other four categories since four categories received a mean rank of 4.0 or better. These four categories include Limitations 4.337 , Applications 4.224, Software 4.194, and Values 4.045. These four categories have a total of 36 questions in the top fifty.

A fifth conclusion indicates that the category of Programming is not statistically related to the categories of Application, Limitation and Values, but

is related to categories of Hardware, Impact, Software and Usage.

The study also reveals that only two community college campuses require a computer literacy course of all their students, and two campuses require computer literacy of computer science majors only. However, comments reveal that those faculty selected believe a computer literacy course should be required before a student graduates. Of the majors requiring computer literacy, only Business, Accounting, Computer Science and Secretarial Science are cited.

Two campuses of the seventeen offer computer literacy for credit and non-credit. Ten campuses offer a three credit course and one campus offers a two credit course.

Twenty-two different departments may appear to be a large number however, the reason for twenty-two different departments being contacted in this survey seems to lie with the fact that the Pennsylvania Community Colleges are all uniquely different. One college may include Accounting in the Business department rather than as a separate department, while another college may include Drafting as part of Engineering. This uniqueness may also account for the low numbers of department heads recommended in some areas.

It is evident from the comments of the respondents that they consider software usage and not programming a major part of computer literacy. This is also evident from the results of the study which did not include any content areas from programming in the top fifty questions.

Since only two campuses of the Pennsylvania Community Colleges require computer literacy of all their graduates this would appear to leave students in all other majors at the Pennsylvania Community Colleges on their own in becoming computer literate. Even in the areas cited as requiring computer literacy there is no indication of what content is required to become computer literate. Computer Science majors may very well be required to write programs; whereas, Secretarial Science and Accounting students may only be working with such software as word processing and spread sheets.

In reviewing the responses of faculty to the MECC objectives an outline of a typical three credit computer literacy course begins to develop. This course could be presented as follows:

I. APPLICATIONS

A. Recognize Application uses

1. In repetition
2. In handling large amounts of information
3. In rapid handling of information
4. In storage of information
5. In accuracy

B. Determine how computer applications can assist individuals

1. As a consumer
2. As a worker
3. As a citizen

C. Identify Application costs

1. Of hardware
2. Of Software
3. Of maintenance
4. Of conversion projects

D. Identify Application limitations

1. In hardware
2. In storage
3. In peripherals

II. SOFTWARE

A. Recognize that Software refers to computer programs

1. In operating systems
2. In compilers

3. In application programs

B. Identify the basic elements of an information system

1. Input
2. Processing
3. Output

C. Recognize computer programs as sets of instructions

1. For printing
2. For sorting
3. For calculating

D. Recognize how computers process data

1. For searching
2. For sorting
3. For deleting
4. For updating
5. For summarizing
6. For moving

III. HARDWARE

A. Recognize the use of output devices

1. Display screens
2. Printers
3. Punch cards
4. Tapes

B. Recognize the use of input devices

1. Keyboards

2. Floppy disks

3. Tapes

C. Identify the major components of a computer system

1. Chips

2. CPU

D. Recognize characteristics of a secondary storage system

1. Magnetic tapes

2. Floppy disks

3. Laser disks

IV. LIMITATIONS

A. Recognize the limitation of computers

1. In providing answers

2. In thinking

3. In value judgements

4. In performance

B. Distinguish major differences in Limitations

1. In human capabilities

2. In computer capabilities

V. VALUES

A. Appreciate the value of a computer

1. In routine tasks

2. In ability to use

3. In ability to control

B. Values efficient information processing

1. In accuracy
2. In individual rights
3. In social needs

C. Experiences positive reactions to computers

1. Lack of fears
2. Lack of anxiety
3. Lack of intimidation

VI. IMPACT

A. Recognize the impact of computers

1. On individuals
2. On work situations
3. On recreation
4. On society

VII. USAGE

A. Uses system commands

1. For loading
2. For listing
3. For execution
4. For saving
5. For purging

B. Uses program documentation

1. To select software
2. To run specific tasks

C. Uses online instruction

1. For drill

2. For dialogs

This outline was developed based on the top 50 questions and ranked in order of the categories containing the most questions in the top 50.

Recommendations from the Study

Based on the findings in this study, the following recommendations are made:

- That a three credit computer literacy course in Pennsylvania community colleges stress the areas of Applications, Limitations, Software, Values, and Usage, and not stress the areas of Hardware, Impact, and Programming, since these five categories received 50% or more of their questions in the top fifty. The category of Hardware received only a 35%, and Impact a 25% for questions selected in the top fifty. The category of Programming had 0% of its questions selected for inclusion in the top fifty, with not one of these questions receiving a mean of 4.0 or higher.

- That a three credit computer literacy course in Pennsylvania community colleges stress the fifty items which received a mean score of 4.0 or better as identified in this study. These include 16 items in Application, 9 in Software, 7 in Hardware, 6 in Limitations, 5 in Values, 4 in Impact and 3 in Usage. There were no items selected from the category of Programming.

TOP 50 QUESTIONS

RANKING OF QUESTIONNAIRE

RANK	CATEGORY	QUESTION NUMBER
1	H	1. Recognize that computer hardware refers to the physical components of computer systems.
2	A	1. Recognize that computers and computer-supported applications are used in a wide variety of ways to assist individuals,groups and institutions.
		5. Recognize that computers are generally useful for information-processing tasks which require any of the following:
3	A	d. Repetition
4	A	a. Handling large amounts of information.
5	A	b. Rapid handling of information.
6	A	e. The storage of information in an accessible form.
7	V	1. Does not feel fear, anxiety, or intimidation from computer experiences.
8	S	3. Recognize that a computer needs instructions to operate.
9	S	4. Recognize that a computer gets instructions from a program written in a programming language by a person.
10	L	3. Recognize that computers cannot provide answers to every question.
11	V	2. Feels confident about his/her ability to use and control computers.
12	A	5.c. Recognize that computers are generally useful for information-processing tasks which require accuracy.

RANK	CATEGORY	QUESTION NUMBER
13	S	1. Identify that software refers to computer programs and includes operating systems, compilers, and user (application) programs.
14	S	6. Identify that the basic elements of an information processing system are input, processing and output.
15	A	9. Recognize some advantages of using a computer for storage and retrieval of information.
16	A	2. Recognize specific uses of computers or computer-supported applications.
16	L	4. Recognize that despite "artificial" intelligence computers can not think in the way we normally use the word "think".
16	I	11. Recognize that alleged "computer mistakes" are usually mistakes made by people.
19	L	2. Recognize that computers can not make value judgements.
19	S	5. Recognize that computer programs are sets of sequential instructions which perform many tasks such as printing, sorting, calculating.
19	U	3. Use system commands for an available computer system (e.g., command to load, list, execute, save and purge files).
22	L	1. Recognize that computers are machines designed, built and operated by humans to assist in many tasks.
23	H	12. Recognize that display screens, printers, punch cards, tapes serve as output devices.
24	A	3. Recognize common types of computer applications, and be able to give an example of each.

RANK	CATEGORY	QUESTION NUMBER
24	H	11. Recognize that keyboards, punch cards and tape serve as input devices.
26	S	9. Identify the need for data to be organized if it is to be useful.
26	A	7. Recognize that innovations in computer hardware and software continually expand the potential utility of the computer.
28	U	4. Use program documentation to select and run a variety of software packages for specific tasks.
29	A	6.b. Recognize that some of the more important factors which limit and/or restrict computer use include people's attitude (fears, anxieties).
30	H	4. Recognize that CPU stands for Central Processing Unit.
31	H	3. Identify at least five major components of a general purpose computer system.
32	L	6. Distinguish major differences between human capabilities and computer capabilities.
33	H	10. Recognize the characteristics of secondary storage systems including magnetic tapes, floppy disks, etc.
34	I	2. Recognize that computers and computer-supported applications have a major impact on the way ordinary citizens live, work and play.
35	S	11. Recognize that computers process data by searching, sorting, deleting, updating, summarizing, moving.
35	A	11. Determine how computers and computer-supported applications can assist an individual as he/she plays various roles, i.e., consumer, worker, citizen.

RANK	CATEGORY	QUESTION NUMBER
37	L	5. Identify a number of things that computers can not do or can not perform efficiently.
37	A	8. Identify some of the features of a computer-supported application which makes it easy to use.
39	A	6.c. Recognize that some of the more important factors which limit and/or restrict computer use include unavailability of suitable software applications.
39	A	6.a. Recognize that some of the more important factors which limit and/or restrict computer use include cost (hardware, software, maintenance, conversion, etc.).
41	S	7. Identify the fact that information is data which has been given meaning.
42	A	6.d. Recognize that some of the more important factors which limit and/or restrict computer use include hardware limitations, storage limitations, lack of peripherals, etc.
42	V	9. Values increased communications and availability of information made possible through computer use provided that it does not violate personal rights to privacy and accuracy of personal data.
44	H	2. Recognize that chips are small pieces of silicon and they contain electronic logic networks called circuits, and that a computer can be made up of chips mounted on boards.
45	S	10. Identify the fact that data processing involves the transformation of data by a set of pre-defined rules.
46	V	7. Values efficient information processing provided that it does not neglect accuracy, the protection of individual rights, and social needs.

RANK	CATEGORY	QUESTION NUMBER
47	V	8. Values computerization of routine tasks so long as it frees people to engage in other activities and is not done as an end in itself.
47	U	2. Interact with a computer in an online instructional learning situation involving drill and dialogs.
47	I	3. Recognize that for at least the short term future, computers will continue to be made smaller while the amount of information they can hold will continue to increase.
50	I	14. Recognize that even though a person does not go near a computer, he or she is affected indirectly because the socoety is influenced by computerization.

A = Applications

H = Hardware

I = Impact

L = Limitations

S = Software

U = Usage

V = Values

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